ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

Decommissioning Closeout Report for the 707 Closure Project

Revision 1

July 19, 2005

Reviewed for Classification
Name:
Date: 7/19/05

N RECORD

1/17

TABLE OF CONTENTS

TABLES AND FIGURES

1.0 Introduction

In accordance with the Building 707 Closure Project Decommissioning Operations Plan (DOP), a closeout report is required upon completion of decommissioning activities. In accordance with the Building 707 DOP, Section 10.4, this closeout report will consist of a brief description of the work completed, including:

- Verification that remedial action goals have been met;
- Remedial action description;
- Dates and duration of specific activities;
- Any modifications to the original DOP;
- Final sampling and analysis reports;
- A description of the quantity and characteristics of the wastes generated and how the wastes were stored or disposed;
- Site reclamation; and
- Demarcation of wastes left in place.

The Building 707 Closure Project is comprised of Building 707 (including the 707A Annex) and various support facilities located within the Site's Industrial Area. The DOP identified Building 707 as a Type 3 facility; Buildings 708, 709, 718, 731, 732, 778, and Tank T-206 as Type 2 facilities; and Buildings T-707S, 711, 711A, and 20 aboveground tanks located within the Building 707 Closure Project as Type 1 facilities. Building 709 was re-characterized as a Type 1 facility as a result of the pre-demolition survey process as documented in Minor Modification #1 to the Building 707 DOP. This closeout report addresses all facilities within the Building 707 Closure Project. Figure 1 provides a map showing the locations of the Building 707 Project facilities.

Documentation that was submitted as part of this project, such as Pre-Demolition Survey Reports (PDSRs), will not be included in this report; instead, references to these documents are provided and a copy of the Administrative Record (AR) index for this project is included in Appendix A of this report. When completed and approved by DOE and the Lead Regulatory Agency (LRA), this Decommissioning Closeout Report will be submitted to the 707 Closure Project Administrative Record Post-decisional File.

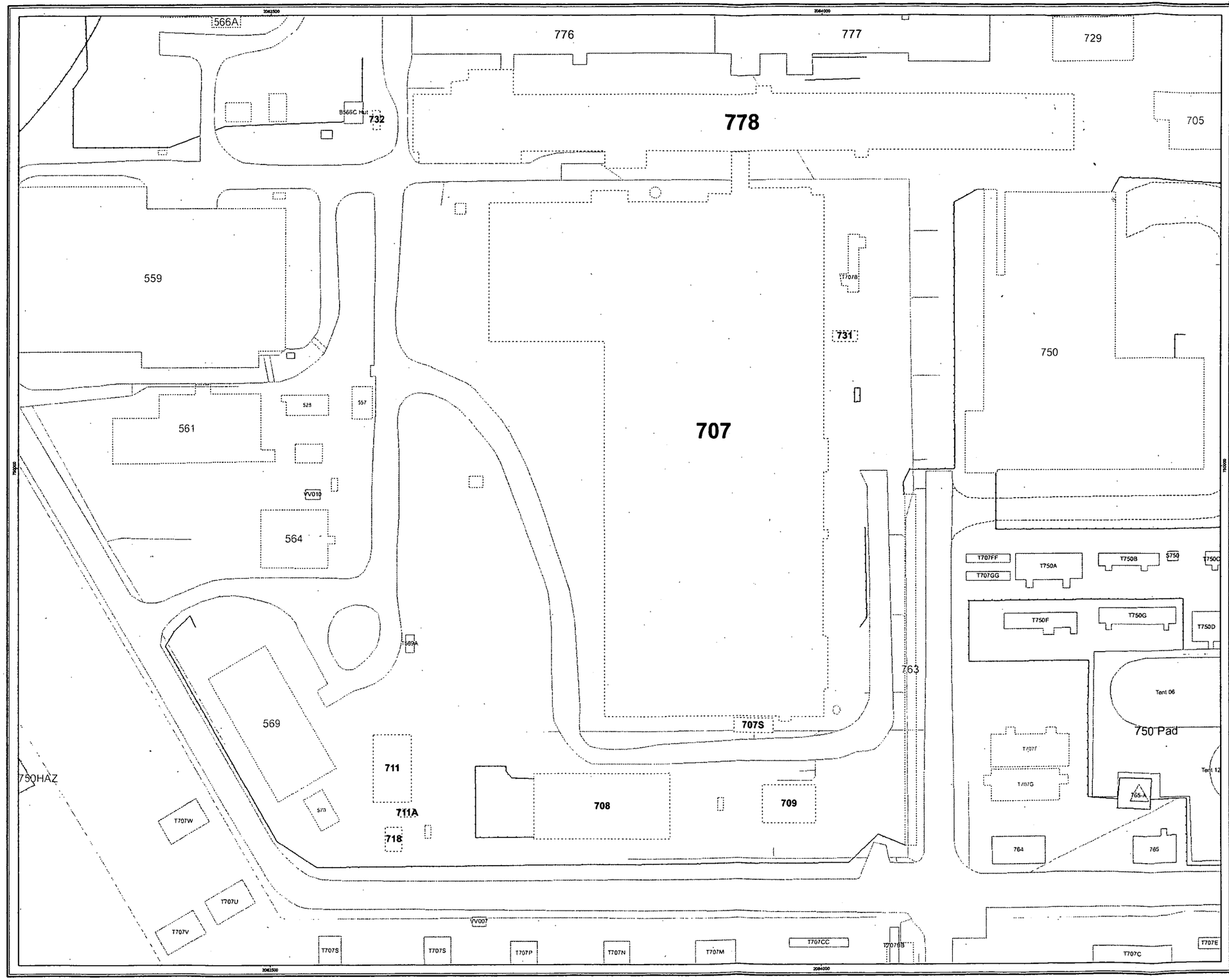
1.1 Building Descriptions

Building 707 (Type 3) was a two-story structure with a single-story addition located on the east side of the main building. To the northwest was a freestanding two-story structure (i.e., the 707A Annex), which had a separate east wall, but was considered to be part of the main structure. The foundations for the building were cast-in-place concrete caissons and grade beams. The caissons were cast in holes drilled into bedrock and are connected by reinforced concrete tie beams. Structural framing consisted of a pre-cast, pre-stressed concrete twin-tee roof and second floor, supported on pre-cast concrete beams, girders, and columns.

2

Figure 1

Building 707
Closure Project Facilities



EXPLANATION

Major Project Building

Standard Map Features

- Demolished Facility
- Remaining Facility
- Lakes and Ponds
- Demolished Roads
- Paved Roads
- Dirt Roads
- Railroad Removed
- Railroad Remaining
- Fence Remaining
- Streams, Ditches, or Other Drainage Features

N

30 0 30 60 90 120 Feet

State Plane Coordinate Projection
Colorado Central Zone (3476)
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared By:
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Prepared For:
KAISER•HILL COMPANY

DATE: 4/20/2005

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3

The first floor consisted of a concrete slab on grade. To prevent the potential for the spread of fire and/or contamination from one room to another, the first floor was configured into a series of modules (Modules A through H, J, and K), separated by hallways. A network of chainveyors ran between the modules to provide for the transfer of materials between production areas within Building 707, and between Building 707 and Building 776/777.

The second floor was an open room containing ventilation fans, filter plenums, pumps, and tanks that supported first-floor operations. The basement was cast-in-place concrete, and contained a variety of tanks (referred to as the "C-Pit tanks") that were used to collect and clean spent solvent and machine oil. Other below-ground features included a series of autoclaves used for the assembly of parts in a heated, high-pressure, helium atmosphere, and one elevator shaft.

Building 708 (Type 2) was a windowless, single-story, concrete structure with a concrete slab floor on grade and a neoprene Hypalon® roof. The building consisted of a single open room, which housed the Building 707 emergency generator and the supplied breathing air system for the 700 Complex (i.e., Buildings 707, 771, 776/777). The building also housed the chillers that supplied ethylene glycol water solution (brine) to the closed loop cooling systems in Building 707.

Building 709 (Type 2; reclassified to Type 1 in DOP Modification #1) was a cooling tower that was constructed in 1969. The cooling tower was a square wooden structure that sat within a concrete basin. The 35-foot tower had two cells, each with separate fan motors and gearboxes.

Building 718 (Type 2) was an auxiliary shed, containing the plenum deluge system for Building 711.

Building 731 (Type 2) was a plenum deluge/process waste pit constructed of reinforced concrete, with a reinforced concrete stairway leading to the below-ground portion of the structure. The pit contained two 1,650-gallon fiberglass collection tanks and associated ancillary equipment. Waste collected in the tanks (e.g., chiller condensate, emergency eye wash/shower wastewater, decontamination water, and plenum deluge water) was transferred to Building 374 for treatment.

Building 732 (Type 2) was the former laundry pumping vault. The concrete structure contained one 800-gallon storage tank and ancillary equipment, which were used to filter wash water from the Building 778 laundry prior to transfer to Building 374 for treatment.

Building 778 (Type 2) was a metal, Butler®-type building, located between Building 707 and Building 776/777. This building provided all-weather access to Buildings 707 and 776/777 through two enclosed corridors. In addition, it contained a portion of the chainveyor that was used to transport material between production areas in Buildings 707 and 776/777. The building housed the maintenance shops and the locker/shower facilities for those buildings. A laundry facility was added to the building when plutonium laundry operations were consolidated on site. In the late 1980s, an addition was added to the north side, adjacent to the laundry, to house a filter plenum for the air exhausting from the dryers.

4

Trailer 707S (Type 1) was originally used to store machining oil, cutting fluid, lubrication oils, greases, and used oils, which were blended for other uses. Later the shed was used for equipment storage. The building was constructed of metal panels, a metal roof, and wooden floor.

Buildings 711 and 711A (Type 1) supplied tower water to the cooling systems in Buildings 707, 708, and 750. Building 711 was the cooling tower and Building 711A housed an emergency diesel pump for the cooling tower.

Underground Storage Tank System (Type 1) Tank T-290 was a diesel fuel tank system, which was emptied, foamed, and closed in place in 1996.

Aboveground Storage Tank Systems (Type 2 and Type 1) supporting Building 707 operations were located outside the facility. These tanks included carbon tetrachloride Tank T206/D2; liquid argon Tank 208; helium Tanks T209-T221 and T284; liquid nitrogen Tank T-223; and diesel fuel Tanks T-324, T-325, TK-11 and TK-16. The carbon tetrachloride tank, T206, was designated as a Type 2 facility in the DOP due to chemical hazards, but it was free released and the metal was recycled. Documentation is included in the Set T1 work package.

1.2 Building 707 History

Facilities within the Building 707 Closure Project were designed and constructed in the early 1970s to replace the manufacturing processes originally performed in Building 776/777. Operations were divided into eight categories: casting, forming, metallurgy, machining, assembly, inspection, non-destructive testing of plutonium parts, and associated support services. Plutonium metal feed was cast into ingots of the required shapes, which then proceeded through standard metalworking steps to become finished weapons parts. Finished plutonium parts and parts made of other materials, such as uranium, beryllium, and stainless steel, were assembled into subassemblies, which were joined to become final assemblies. Parts were inspected and tested at various points throughout the production process.

Prior to the change in mission, the production process began in Modules A, J, and K, where feed material was stored in preparation for casting into various shapes. Module B housed metallurgical operations, which were performed to roll, heat treat, and shape plutonium parts, which were then sent to machining operations. After shaping, excess metal was cut off and sent to Module C to be briquetted.

Module C was used to machine plutonium parts to the required dimensions. Turnings and chips from machining operations in Module C and trimmings from forming operations in Module B were degreased and sent to the briquetting press to be made into pucks, which were returned to the casting furnaces to be re-cast into feed ingots. In Module D, serial numbers were affixed to finished parts, which were cleaned with solvents, weighed, and inspected.

Plutonium pits were assembled in Module E, beginning with the welding of matched hemi-shells with electron beam welders. The pits were then inspected using any of a number of inspection disciplines, including radiography x-ray, weld scanners, eddy current testing for weld

penetration, and fluorescent dye penetration for cracks and voids. The subassemblies were then washed and sent to Module F for final assembly.

Module F, known as the "super dry room" because of the precisely controlled humidity, temperature, and airflow, was the final assembly point where the plutonium, uranium, and covering parts were put together. The covering parts, such as beryllium and stainless steel, were welded shut. The completed assembly was then "pumped down" on a heated table to check for leaks and to remove moisture and other contaminants. Module F also contained a mass spectrometry laboratory that was used to analyze gases in the assembled pits.

During production, several operations were carried out in Module G, including brazing of plutonium parts encased in other non-radioactive metals; brazing of non-radioactive subassemblies; cleaning of aluminum, stainless steel, uranium, and beryllium parts; inspection of these subassemblies; and, if needed, disassembly of rejected units. Module H was a high-pressure assembly area for plutonium, vanadium, beryllium, titanium, and uranium parts. High-pressure assembly was accomplished in an autoclave under a heated, high-pressure helium atmosphere. Beryllium parts were baked in vacuum furnaces to remove moisture.

1.3 Verification that Action Goals Were Achieved

Five action objectives were established for the 707 Closure Project prior to initiating decommissioning:

1. Achieve cleanup and closure in a manner that is safe to workers and the public, and protective of the environment.

   Decommissioning activities were completed within regulatory requirements. The 707 project completed D&D activities with an excellent safety record of less than 1% recordable injuries and less than 1% Lost Work Day Case rate. This excellent safety record was maintained throughout the demolition of 707. Demolition of 707 was completed without any recordable injuries. Environmental monitoring during demolition verified that no emissions above the action level were measured at the perimeter air monitoring stations.

2. Decontaminate and demolish structures to three feet below the proposed final grade.

   All structures were removed to at least three feet below final grade.

3. Underground structures are removed and/or stabilized.

   Underground structures associated with Building 731 and 732 process waste pits were removed completely. Underground process waste lines below three feet below final grade were filled with grout and left in place following confirmation sampling verifying absence of soil contamination. The below grade areas in Building 707, C pit and the autoclave vaults, were completely removed. The only remaining building structures are building footers below three feet of final grade.

5

4. In-process characterization will be conducted to verify that applicable decontamination goals and waste acceptance criteria of the receiving Treatment, Storage and Disposal (TSD) facilities have been met.

   In-process characterization was conducted throughout decommissioning to characterize waste appropriately, both radiologically and chemically, and to determine the correct disposal path and verify that waste acceptance criteria were met for the receiving facilities.

5. Verify through a Pre-Demolition Survey conducted prior to demolition that buildings have been sufficiently decontaminated to meet applicable performance specifications.

   The facilities were decontaminated to meet applicable performance specifications, as documented in the Pre-Demolition Survey Reports.

2.0 Project Description

Decommissioning activities were conducted in the 707 complex in accordance with the Building 707 DOP, which was approved by the Colorado Department of Public Health and Environment (CDPHE) on January 18, 2001.

The Building 707 Closure Project was divided into small groupings of similar equipment and rooms that could be worked independently. Initially a total of 17 groups, or Sets, were defined for the project. The RFETS Decontamination and Decommissioning Characterization Protocol (DDCP) was then used to complete a reconnaissance level characterization for each Set. Results were documented in the Building 707 Closure Project Reconnaissance Level Characterization Report (RLCR), dated August 1, 2000, which identified the presence of radiological and chemical contamination in many of the Sets. The Building 709 cooling tower was included in a separate RLCR for "Group A Facilities", dated June 14, 2000.

The Sets were rebaselined in FY 2002, further subdividing the original 17 Sets into 99 sets. This was documented via DOP Modification #2, which was approved by CDPHE on January 10, 2002.

2.1 Decommissioning Sequence

In general, Building 707 decommissioning proceeded as follows:

- Miscellaneous loose and fixed equipment and materials were removed from work areas.
- Electrical power to components was de-energized, locked out/tagged out, and disconnected. Temporary power was used as necessary.
- Tanks (interior and exterior) were drained, surveyed, and removed as waste. Resource Conservation and Recovery Act (RCRA) tank systems were closed in accordance with approved closure plans in the DOP.

- Internal equipment was removed from gloveboxes and they were decontaminated to the extent practicable. Lead was removed from glovebox exteriors.
- Gloveboxes were size reduced as necessary and removed as waste. Depending on contamination levels, containment tents were built as necessary for size reduction.
- Chainveyors in the overheads were removed.
- After modules and room areas were clear of gloveboxes and other equipment, mechanical and electrical systems were removed from the overhead areas.
- Glovebox ducting, zone I plenums and glovebox dry air systems were stripped out.
- Zone II and III plenums and ducting were surveyed and removed if contaminated above unrestricted release levels.
- Asbestos containing materials were identified and removed by a qualified subcontractor.
- Module walls were removed.
- The building structure was decontaminated using concrete shaving and hydrolasing.
- Hazardous substances were removed, including light bulbs/lamps, batteries, light ballasts, lead used in plumbing joints and roof flashings, etc.
- RCRA closures of secondary containment areas were completed in accordance with approved closure plans in the DOP.
- Final radiological surveys were conducted and documented in the PDSRs.

2.2 Project Milestones

All work activities were conducted using the Integrated Work Control Program (IWCP). The following outlines the actual sequence of events and major milestones:

- January 18, 2001 – Building 707 DOP approved by CDPHE.
- April 2001 – Building 707 Material Access Area (MAA) closes
- 3rd quarter FY01 – Readiness assessment completed for decommissioning.
- October 30, 2001 – CDPHE approved demolition of cooling tower 709.
- December 2001 – Cooling tower 709 demolition completed.
- December 2001 – Four large autoclave units were removed from H Module.
- June 2002 – Module G decommissioning completed.
- July 22, 2002 - The Building 707 Decommissioning Basis for Interim Operations (DBIO) was implemented. This DBIO analyzed the hazards present during the remaining deactivation and decommissioning mission of the building, and provided the authorization basis for planned activities through demolition.
- December 2002 – The final Sets in Modules A and D were completed.
- December 2002 – Removed 19 RCRA mixed residue tanks in C Pit. These were the only RCRA tanks in the building.
- January 2003 – Ceased effluent air sampling for all stacks and vents in Building 707, in accordance with active decommissioning provisions in the site monitoring agreement.
- March 2003 – Built a repackaging facility in Module A for size reduction and repack operations.
- September 2003 – The final Set in Module E was completed. This set included four large electron beam welders.

6

- September 2003 – Completed the final Set in Module J. This set included five large furnaces and associated gloveboxes and chainveyors.
- October 2003 – Module wall removal began.
- November 2003 – Concrete shaving for radiological decontamination began.
- February 2004 – The limited area in Building 707 was downgraded to a property protection area. This follows successful removal and destruction of classified tooling in the glovebox B-85 press.
- March 2004 – Building 707 was declared criticality incredible in March. This allowed termination and removal of the criticality detector and alarm systems.
- March 2004 – Final Set in Module B was completed. Set B6 included removal of the B85 hydroform press and a below-floor pit containing an oil tank. The hydroform press was successfully lowered onto its side in preparation for in-situ dismantlement inside a containment tent. This was a significant accomplishment, as the press weighed 35 tons, and the base was in a pit in the floor. The press was dismantled using plasma arc and mechanical cutting, with workers in supplied breathing air.
- 3QFY04 – Set U-7 complete: Building 707 safety systems removal, including criticality detection system, fire detection system, fire suppression system, and LS/DW system.
- August 2004 – The final Set in Module K was completed. This set included the stripout, decontamination and removal of the X-Y Retriever. This work was conducted in supplied breathing air and included removal of the last of the 377 glovebox/chainveyor equivalents in B707.
- August 2004 – Building 711/711A Cooling Tower was isolated and demolished.
- September 28, 2004 – Building 718 PDSR was approved by CDPHE.
- September 2004 – Demolition of B718 completed.
- October 19, 2004 – The PDSR for Building 708 was approved by CDPHE.
- October 2004 – Type 1 structure T707S was approved for demolition.
- October 2004 – Oak Ridge Institute of Science and Education (ORISE) conducted independent verification of final surveys.
- November 2004 – Building 708 demolition was completed.
- November 2, 2004 – PDSR for the second floor and the exterior of Building 707 was approved by CDPHE.
- December 2, 2004 – Building 778 PDSR was approved by CDPHE and demolition was initiated.
- December 2, 2004 – PDSR for Buildings 731 and 732 was approved by CDPHE.
- December 7, 2004 – PDSR for the first floor of Building 707 was approved by CDPHE. Demolition of Building 707 commenced.
- December 2004 – Building 732 demolition commenced.
- January 2005 – Building 731 demolition commenced.
- February 2005 – Completed demolition and removal of all remaining buildings in the Building 707 cluster, including contaminated portions of the Building 707 and 778 floor slabs, and Building 731 waste pit.

2.3 Decontamination

Following removal of all equipment and gloveboxes from Building 707, the module walls were removed, both for asbestos abatement and to allow access to the floor area beneath the walls for decontamination. Floors were surveyed, and the majority of the floors were decontaminated using a dry shaving technique. The rotary drum shavers were equipped with a vacuum system connected to HEPA filter units. This technique removed the paint and the top layer of concrete from the floors. Several passes were made with the shaver in some areas, depending on the thickness of paint and the residual contamination measured after the first pass. In Building 707, most of the first floor and parts of the second floor were decontaminated by shaving. Portions of the floor in Building 778 were also shaved.

Some areas that were not accessible for shaving were decontaminated using hydrolasing, or high-pressure water jets, to remove paint and contamination. These areas included the C-Pit basement areas, "sheep dips" (small stairwells under the glovebox lines), overhead areas, and walls and columns. Water from the hydrolasing operations was collected in a temporary tank farm constructed on the west side of the facility. The water was filtered and recycled back to the hydrolasing operations in the building. Following completion of hydrolasing operations, the remaining water was sampled and dispositioned by the site Industrial Wastewater Program.

In-process radiological characterization was performed to determine the extent of decontamination efforts required. Following completion of hydrolasing and shaving, final surveys were conducted in accordance with the site PDSP. Final building characterizations were documented in the PDSRs for the buildings. DOE contracted an independent verification (IV) of the characterization data through the Oak Ridge Institute of Science and Education (ORISE).

2.4 Demolition

The demolition phase of decommissioning included removal of the building shells, slabs, and foundations/footings to a depth at least three feet below grade. Demolition was performed by K-H. Demolition was conducted utilizing standard mechanical demolition equipment, including excavators, shears, processors, and front-end loaders. Concrete saws were used to cut the floor slabs. Dust control during demolition was provided by a combination of fog cannons and fire hoses.

Demolition began with some of the outbuildings, including cooling towers 709 and 711, and Buildings 718 and 708. These buildings all met the unrestricted release criteria prior to demolition. In December 2004, demolition began on Buildings 707, 778, and 732, followed by Building 731 in January 2005. Demolition and removal of all buildings in the Building 707 cluster was completed in February 2005, including contaminated portions of the Building 707 and 778 floor slabs.

7

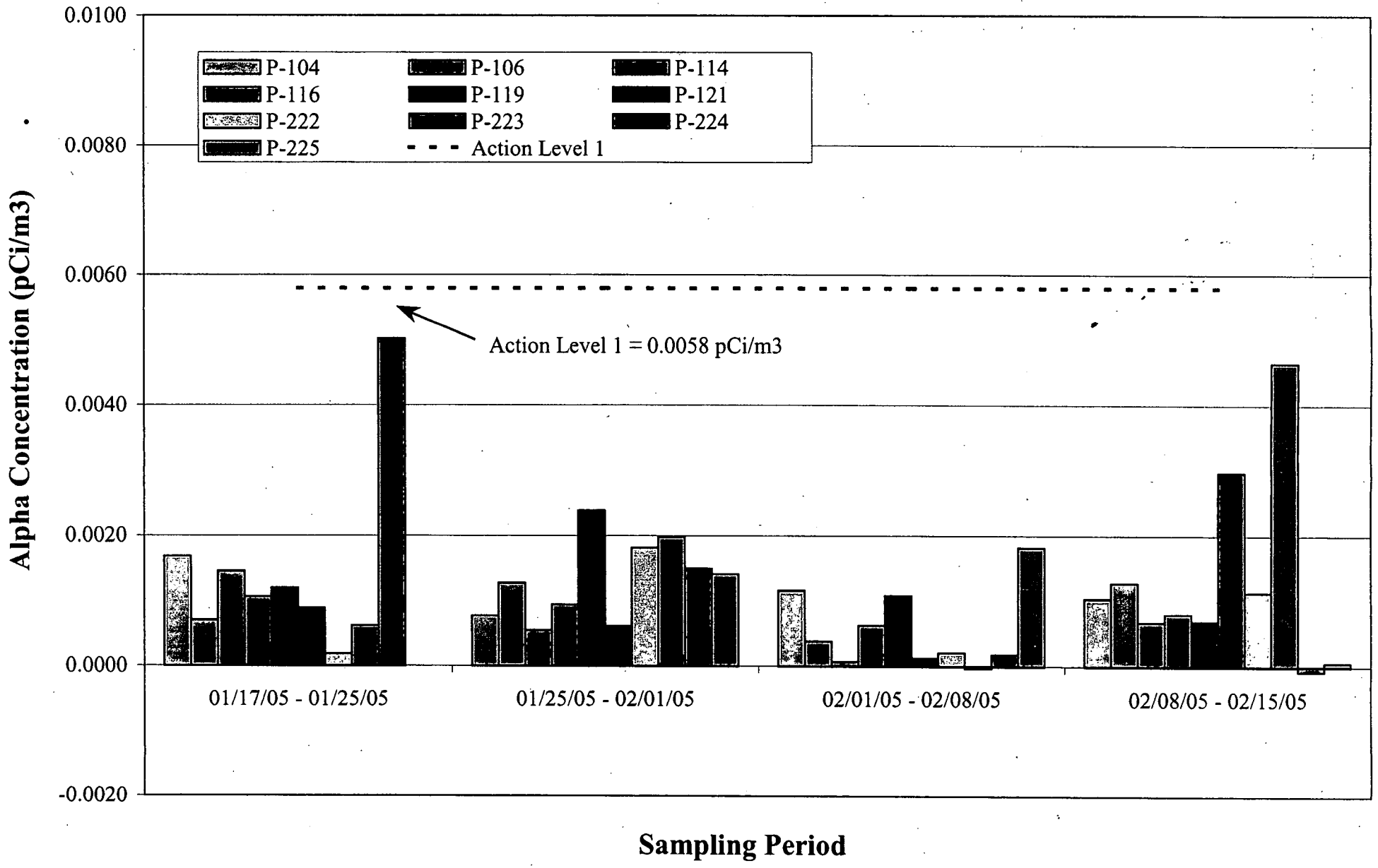
2.4.1 Air Sampling During Demolition

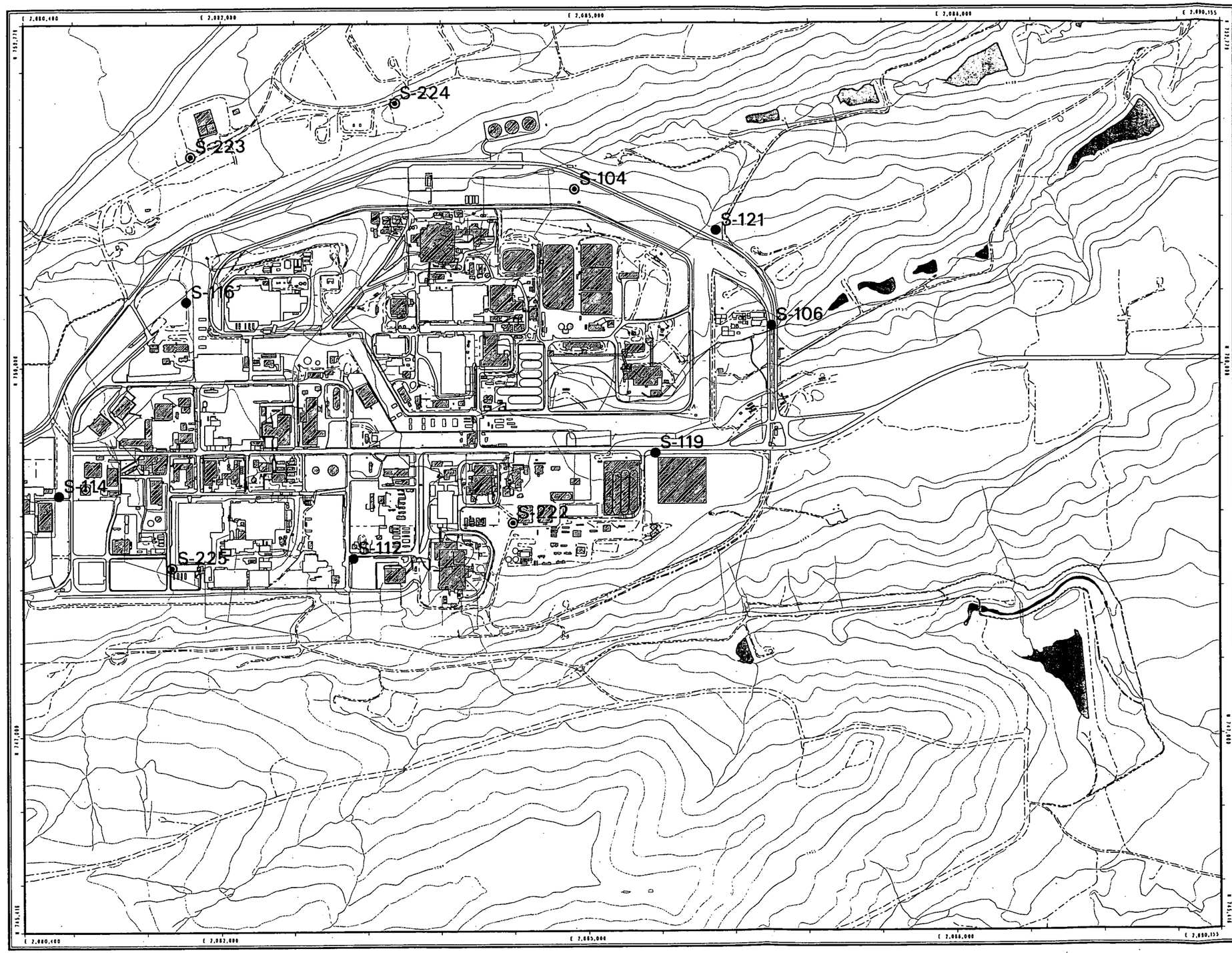
Environmental air monitoring during demolition was performed in accordance with the requirements of the Site Integrated Monitoring Plan (IMP). The existing Radioactive Ambient Air Monitoring Program (RAAMP) sampler network was used for ambient air monitoring during removal activities. This network includes perimeter samplers as well as the site industrial area samplers for project-specific sampling. Project monitoring (PM-Rad) was carried out during demolition and removal activities using existing RAAMP samplers arrayed around the Site's Industrial Area. PM-Rad characterized the effects of potential short-term emissions from the project on ambient air quality and receptors closer to the projects than the Site perimeter by quantifying gross alpha activity on filters. In accordance with the IMP, filters were collected weekly and screened for long-lived alpha contamination. The results were used to calculate the airborne concentration in units of activity per volume of air drawn through the filter (pCi/m^3). These results were compared to two predefined Action Levels, corresponding to a 1.0 mrem dose rate (0.0058 pCi/m^3) and a 5.0 mrem dose rate at the sampling location, based on the assumption that the hypothetical receptor has been exposed for two weeks (one week of sample collection, one week for analysis).

PM-Rad monitoring was initiated in January 2005 during the removal of the contaminated portions of Building 707 slab. Results showed no emissions above the 1.0 mrem dose rate action level. Figure 2 graphically presents the monitoring data collected during this period, and Figure 3 shows the air sampler locations. Locations P-224 and P-223 were on generator power during working hours only, resulting in lower sampler volumes and artificially elevated concentrations (relative to line-powered samplers operating for 24hr/day).

In addition to the site RAAMP samplers, the project conducted local workplace air monitoring using four air samplers in close proximity to the Building 707 demolition activities. The air filters were collected daily throughout the entire demolition timeframe, and were counted for alpha contamination. All samples were below the minimum detectable activity (MDA). Figure 4 shows the highest daily reading of the four workplace air monitors, shown in units of Derived Air Concentration (DAC). The Action Level of 0.3 DAC corresponds to the level at which respiratory protection is required.

Figure 2
Building 707 Slab Removal Project Monitoring Data
Sampling Period: January 17 - February 15, 2005





Industrial Area Performance Monitoring for Radionuclides Network

Air Sampling

EXPLANATION

- Sampler on Grid Power
- Sampler on Generator Power

Standard Map Features

- Buildings and other structures
- Demolished buildings and Other Structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:

Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

N

Scale = 1 : 9500
1 inch represents approximately 792 feet

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

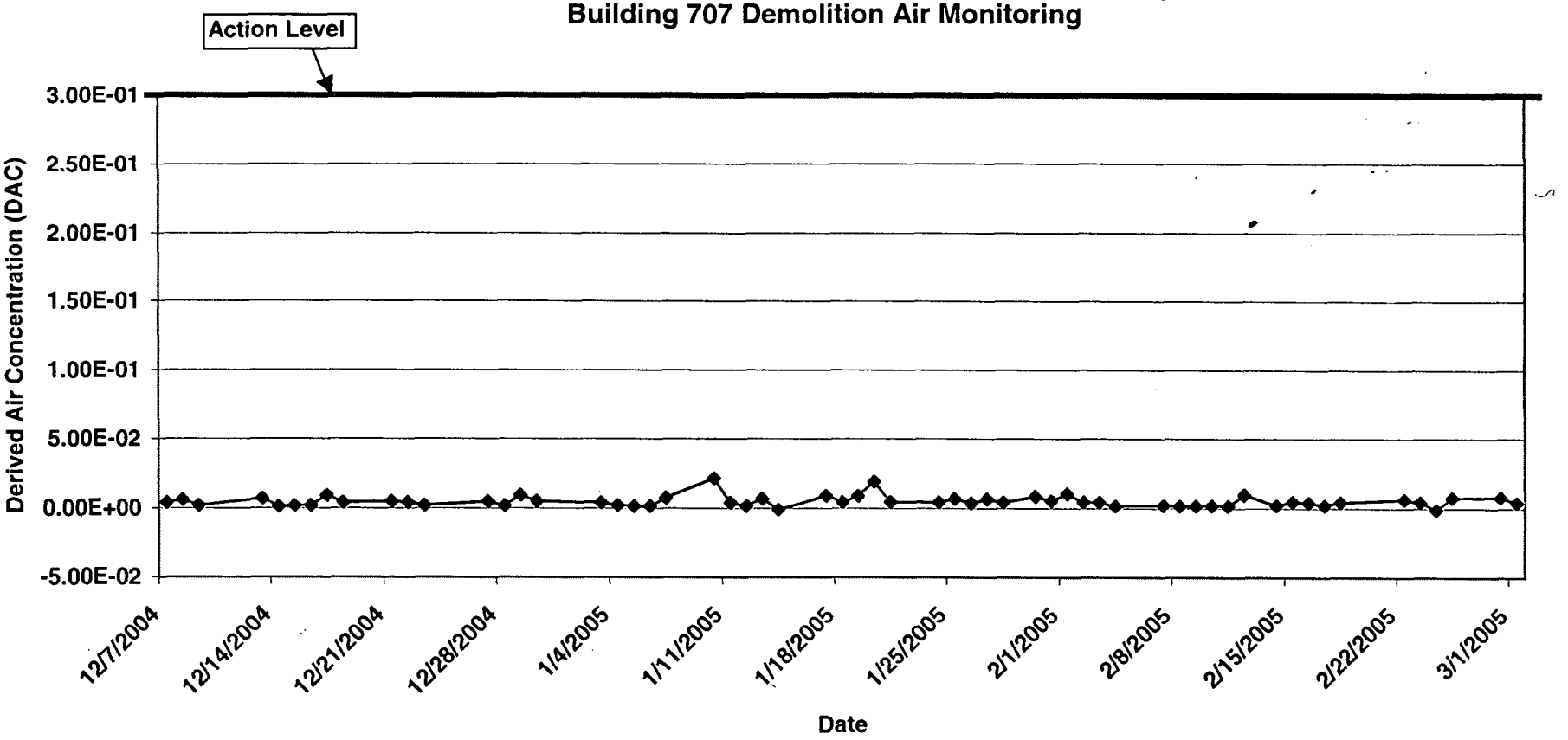
Prepared by: CH2MHILL

Prepared for: KAISER-HILL COMPANY

November 29, 2004

NT_Svr w:/projects/fy2005/05-0028/fe_perf_mon_rad_net_V2.aml

Figure 4
Building 707 Demolition Air Monitoring



3.0 Project Documentation

This section describes the documentation that was prepared to satisfy the requirements in the Rocky Flats Cleanup Agreement (RFCA) for decommissioning the Building 707 cluster. Documentation that was submitted as part of this project is referenced; a copy of the AR index for this project is included as Appendix A of this report.

3.1 DOP Modifications

As previously stated, the Building 707 DOP was approved by CDPHE on January 18, 2001. There were three minor modifications made to the DOP:

DOP Modification #1 was approved by CDHPE on October 16, 2001. The modification included:

- Transition of Type 2 facilities to Type 1 as a result of the Pre-Demolition Survey data, specifically re-typing cooling tower 709 to a Type 1 facility.
- Inclusion of clean closure through the demonstration of no contamination, as a RCRA closure method, for the container storage areas in Module E and Room 196.

DOP Modification #2 was approved by CDPHE on January 10, 2002. The modification included:

- Updates to the Set descriptions. The Sets were re-baselined and the original 17 Sets were expanded into 99 Sets.
- Amendments that ensure consistency between the 707 DOP and the 776/777 DOP since the projects merged under common management.
- Updates and corrections to Table 20, Building 707 RCRA-regulated units.
- Correction of typographical errors and incorrect references.

CDPHE did not approve one portion of the modification request. This item requested removal of the requirement for a Professional Engineer (P.E.) certification for RCRA closure, which would have been consistent with the Building 776/777 DOP. However, CDPHE did not approve this request because they consider P.E. certification of closure to be a substantive performance-based requirement.

DOP Modification #3 was approved by CDPHE on November 2, 2004. The modification included:

- Changing all references to "three feet below grade" to "three feet below final grade" for consistency.
- Changing removal of contaminated portions of the building shell to "before or after" demolition (previously said prior to demolition). This allowed removal of contaminated portions of the floor slabs and the C-pit basement after the building shell had been removed.
- Revising the Environmental Restoration (ER) interface section to specify criteria for removing or leaving the process waste lines (previously said all lines below the slab would be removed.) The new criteria were consistent with approved ER practices across plantsite.

Table 1 summarizes the project documentation for this phase of the project.

Table 1 707 Closure Project DOP Modification Documentation

Document	Date	AR Document Number
DOP Modification #1 submittal to DOE	September 26, 2001	B707-A-000062
DOP Modification #1 approval by CDPHE	October 16, 2001	B707-A-000065
DOP Modification #2 submittal to CDPHE	December 18, 2001	B707-A-000076
DOP Modification #2 approval by CDPHE	January 10, 2002	B707-A-000079
DOP Modification #3 submittal to DOE	October 28, 2004	B707-A-000126
DOP Modification #3 approval by CDPHE	November 2, 2004	B707-A-000147

3.2 Pre-Demolition Characterization

Facilities within the 707 closure project were characterized using a three-step approach: reconnaissance level characterization (RLC), in-process characterization, and pre-demolition survey (PDS).

3.2.1 Reconnaissance Level Characterization

The purpose of the RLC is to provide an initial assessment of the contamination, hazards, and other conditions associated with a facility. The Building 707 Closure Project RLCR was completed on August 1, 2000. The Building 709 cooling tower was included in a separate RLCR for "Group A Facilities", dated June 14, 2000. The RLC was conducted in accordance with the RFETS DDCP.

The facilities were classified pursuant to the RFETS Decommissioning Program Plan (DPP). The initial typing indicated that Building 707 was a Type 3 facility, and Buildings 778, 708, 709, 718, 731, 732, and the carbon tetrachloride tank were considered Type 2 facilities. All other facilities within the 707 cluster (i.e., Buildings T707S, 711, 711A, and the other 20 outside storage tanks) were considered Type 1 facilities.

3.2.2 In Process Characterization

Additional radiological and chemical characterization was conducted during decommissioning, as facility components were removed and building surfaces exposed. This type of characterization is referred to as in-process characterization. Data from in-process characterization was used to identify additional hazards; refine approaches to component removal, size reduction, and decontamination; revise waste volume estimates; and modify environmental, safety and health controls, as necessary (e.g., asbestos and beryllium characterization.) In-process characterization was also conducted to verify that decontamination activities have achieved the applicable performance specifications, such as release or reuse criteria and waste acceptance criteria (WAC) of the receiving disposal facility. All laboratory analytical data has been archived through Kaiser-Hill Analytical Services Division.

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3.2.3 Pre-Demolition Survey

Final radiological surveys were conducted in accordance with the site Pre-Demolition Survey Plan (PDSP) prior to demolition. For Type 2 and 3 facilities, the results were summarized in a PDSR that received approval from DOE and CDPHE. (For approval dates, refer to Table 2.) For Type 1 facilities, the PDS results were documented in the RLCR in accordance with the site PDSP. The results of these surveys demonstrated that Buildings 708, 709, 711, 711A, 718, 707S, and all 21 aboveground storage tanks met the unrestricted release limits specified in the PDSP prior to demolition. Buildings 707 and 778 had portions of the floor slabs and below-grade structures that were contaminated, with the remainder of the buildings meeting the unrestricted release limits. Buildings 731 and 732 were below grade waste pits with small above-ground access sheds; these facilities did not meet unrestricted release and were disposed entirely as low level waste.

The PDSRs included information on chemical contamination as well as radiological. Hazardous substances and wastes were removed from all buildings prior to demolition (with two exceptions noted below) and all RCRA units were appropriately closed. RCRA unit closures are summarized in Appendix B. Asbestos abatement was also completed prior to demolition in accordance with Colorado Air Quality Control Commission (CAQCC) Regulation No. 8, as certified in the Demolition Notification submitted to CDPHE. Beryllium surveys demonstrated that the buildings met the required release levels. Two instances were documented where hazardous constituents were not removed prior to demolition:

1. Non-friable asbestos piping that drained the foundation of cooling tower 709 was left in place 8 to 10 feet below grade.
2. Polychlorinated biphenyl (PCB) contaminated concrete on the vault roof of Building 707 resulting from a historical transformer spill was removed during demolition and dispositioned as Toxic Substances Control Act (TSCA) waste. Due to the thickness of the vault roof, this could not be remediated prior to demolition.

Table 2 summarizes the project documentation for this phase of the project.

Table 2 707 Closure Project Pre-Demolition Characterization Documentation

Document	Date	AR Document Number
PDSR for B709 submitted to CDPHE	October 18, 2001	B707-A-000066
CDPHE approval of B709 PDSR	October 30, 2001	B707-A-000069
Regulatory Contact Record documenting discussion with CDPHE regarding removal of contaminated piping located beneath the slab in the autoclave vaults at the time of demolition	August 2, 2004	B707-A-000107
Regulatory Contact Record documenting notification to CDPHE for demolition of B711 cooling tower, a Type 1 facility.	August 11, 2004	B707-A-000104
Regulatory Contact Record documenting discussion with CDPHE regarding disposition of B778, with portions free-releasable and with contaminated portions to be removed as low	September 2, 2004	B707-A-000113

Document	Date	AR Document Number
level waste.		
Regulatory Contact Record documenting discussion with CDPHE regarding disposition of B731 and B732 as contaminated waste.	September 16, 2004	B707-A-000114
Regulatory Contact Record documenting discussion with CPDHE regarding disposition of PCB-contaminated concrete on vault roof at the time of demolition.	September 20, 2004	B707-A-000112
PDSR for B718 submitted to CDPHE	September 23, 2004	B707-A-000119
CDPHE approval of B718 PDSR	September 28, 2004	B707-A-000125
Regulatory Contact Record documenting discussion with CDPHE about disposition of B707 C Pit as contaminated waste after demolition of the building.	October 6, 2004	B707-A-000123
PDSR for B708 submitted to DOE and CDPHE	October 14, 2004	B707-A-000122
CDPHE approval of B708 PDSR	October 19, 2004	B707-A-000169
Regulatory Contact Record documenting notification to CDPHE for demolition of T707S, a Type 1 facility.	October 20, 2004	B707-A-000124
PDSR for B707 second floor and exterior submitted to DOE and CDPHE	October 25, 2004	B707-A-000127, 128
CDPHE approval of B707 second floor and exterior PDSR	November 2, 2004	B707-A-000148
Regulatory Contact Record documenting discussion with CDPHE regarding leaving asbestos pipe under B709.	November 3, 2004	B707-A-000175
Regulatory Contact Record documenting discussion with CDPHE regarding disposition of B707 contaminated portions of slab	November 4, 2004	B707-A-000132
Regulatory Contact Record documenting discussion with CDPHE regarding disposition of contaminated metal in the overhead of B707 during demolition.	November 8, 2004	B707-A-000135
PDSR for B707 first floor submitted to CDPHE	November 24, 2004	B707-A-000153
PDSR for B778 submitted to CDPHE	December 1, 2004	B707-A-000154
PDSR for B731 and B732 submitted to CDPHE	December 1, 2004	B707-A-000151
CDPHE approval of B778 PDSR	December 2, 2004	B707-A-000145
CDPHE approval of B731 and B732 PDSR	December 2, 2004	B707-A-000146
CDPHE approval of PDSR for 707 for first and second floors and approval to start demolition	December 7, 2004	B707-A-000156

12

4.0 Waste Disposition

The 707 Closure Project generated the following waste types: sanitary, hazardous, low level, low level mixed, TSCA, low level TSCA, transuranic (TRU), and transuranic mixed. Table 3 documents the quantity and disposal sites for these waste types and materials. Wastes generated from January 2001 when the 707 DOP was approved until February 2005 at the completion of demolition are included in these waste totals.

Table 3 707 Closure Project Waste Stream Disposition Summary

1. Sanitary Waste	
Disposal Sites:	Front Range Landfill, BFI Tower Road Landfill, BFI Foothills Landfill
Projected amount (tons):	61,259
Actual amount (tons):	34,767
2. Non-Hazardous, Non-Radioactive Waste	
Disposal Sites:	Onyx, Henderson, CO; Exide Technologies, Reading, PA
Projected volume (m^3):	-
Actual volume (m^3):	102
Additional Information:	Oils, lab pack chemicals, brine, batteries
3. Hazardous Waste	
Disposal Sites:	Superior Special Services, Inc.; Onyx, Henderson, CO
Projected volume (m^3):	4
Actual volume (m^3):	6.3
4. Low Level Waste	
Disposal Sites:	Nevada Test Site, Envirocare of Utah, Diversified Scientific Services, Inc.
Projected volume (m^3):	14,306
Actual volume (m^3):	31,700
5. Low Level Mixed Waste	
Disposal Sites:	PermaFix, Florida; Envirocare of Utah; Pacific Ecosolutions, LLC; Diversified Scientific Services, Inc.
Projected volume (m^3):	83
Actual volume (m^3):	569.3
6. TSCA (PCBs)	
Disposal Sites:	Chemical Waste Management, Kettleman Hills, CA; Onyx, Henderson, CO; Superior Special Services, Inc.; Safety Kleen
Projected volume (m^3):	7
Actual volume (m^3):	32.7
Additional Information:	Includes two rolloffs from vault roof
7. Low Level TSCA	
Disposal Sites:	Envirocare of Utah
Projected volume (m^3):	1
Actual volume (m^3):	0.6

8. TRU Waste	
Disposal Sites:	WIPP
Projected volume (m^3):	1,045
Actual volume (m^3):	1,131
9. TRU Mixed Waste	
Disposal Sites:	WIPP
Projected volume (m^3):	199
Actual volume (m^3):	482

5.0 Site Reclamation

All buildings in the 707 Closure Project were removed to at least three feet below final grade. Removal to this depth included removal of all building floor slabs. Radiologically contaminated areas deeper than three feet below grade in Buildings 707 and 778 (including C pit and the autoclave vault piping in 707, and the laundry and plenum pits in 778) were completely removed. Underground structures associated with Building 731 and 732 process waste pits were completely removed.

Underground process waste lines below three feet below final grade were filled with grout and left in place following confirmation sampling verifying absence of soil contamination. Figure 5 shows the IHSS Group 700-2 components removed and remaining.

Soil sampling was conducted to determine if there was a UBC that ER would need to address; samples verified no UBC for facility 707. Additional sampling was conducted during the removal of the OPWL to confirm no contamination of soil existed; samples verified no contamination existed. Final sampling was conducted to verify all building debris was removed after building demolition; all samples confirmed the removal of all building debris.

Underground utility lines (e.g., alarms, electrical, natural gas, nitrogen, water, etc.) were removed to at least three feet below final grade beneath the building footprints. Utilities outside the building footprints were air gapped, plugged, or otherwise isolated. Figure 6 shows the Building 707 Project Utility Isolations and depths below the surface. These depths relate to the existing ground surface at the time of isolation. Non-friable asbestos piping that drained the foundation of cooling tower 709 was left in place 8 to 10 feet below grade, as discussed in section 3.2.3. This piping is indicated on Figure 6.

The only remaining building structures within the 707 Closure Project are building footers and foundations below three feet of final grade. Figure 7 shows the remaining building foundations. Final site contouring in this sector had not been completed at the time this report was prepared. Final grade for this area is planned in accordance with the final Land Configuration Design Basis and shown on Figure 8.

13

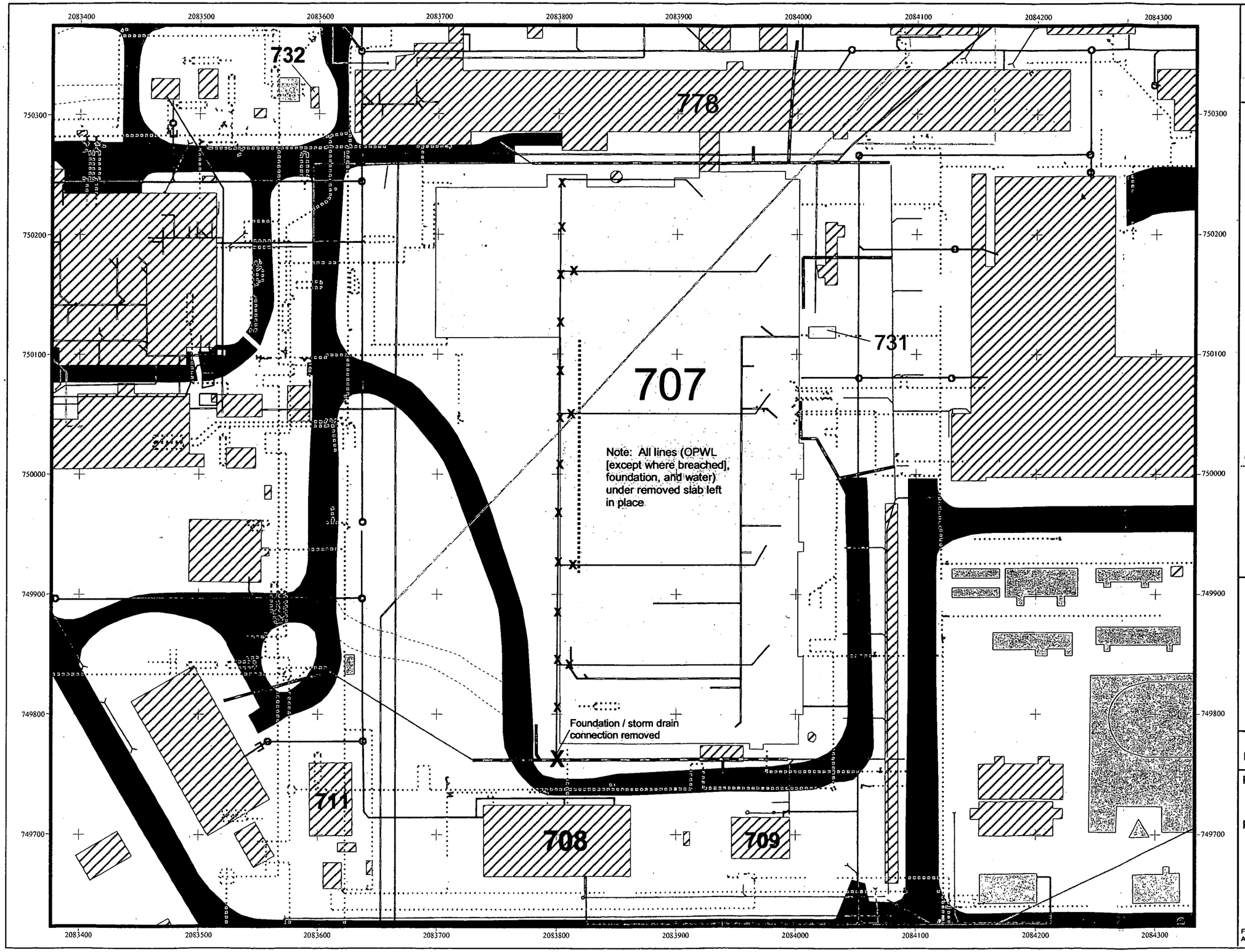


Figure 5

IHSS Group 700-2 Components Removed and Remaining

KEY

- Slabs, basements, and sumps removed
- Line/pipe disruption
- OPWL left in place
- OPWL does not exist
- OPWL removed
- Foundation drain left in place (western line disrupted approx. every 40 ft)
- Coolant oil line left in place
- Coolant oil line removed
- Sewer drain left in place
- Water line left in place
- Storm drain left in place
- Storm drain removed
- Structure
- Demolished structure
- Paved area
- Dirt road

N W E S

25 0 25 50 75 Feet

Scale = 1 : 900

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: RADMS

Prepared for: KAISER•HILL COMPANY

File:W:\Projects\Fy2004\700-2\Closeout\AV_Projects\700-2COR_101101_gpp.apr

Date: March 2005

Figure 6
Building 707
Utility Isolations

Sanitary Sewer MH-97 Removed to 20' Below Grade. Sewer Trenches Blocked w/ Grout 2/4/05

Sanitary Sewer Plugged at MH-98 on 10/11/04

Sanitary Sewer Plugged at MH-99 on 10/11/04

B563 AND B560 2" DCW

B707 8" DCWF Fire Water "E" Riser Isolated 5' Deep 1/23/05

B707 1.5" NG Natural Gas Supply Air Gapped Above Ground & Purged 1/17/04

Fire Water Isolated 8' Deep 11/30/04

B729 6" DCWF

B563 AND B560 COOLING 4" DCWF

B707 6" N2 Supply Manifold Air Gapped near N2 Plant 1/23/05

B707 8" DCWF Fire Water "A" Riser Isolated 5.5' Deep 10/28/04

Water Main Feed to Domestic Supply Isolated 6' Deep 7/21/04

B707 4" SS 4" Sanitary Sewer Plugged at Manhole MH-103 12/1/04

Steam & Condensate Isolated Above Ground when Portable Boilers were Removed 10/13/03

557 1" DCW

B707 0 DCW Domestic Water Isolated 4.5' Deep 11/1/04

B707 8" DCWF Fire Water "B" Riser Isolated 6' Deep 10/28/04

B707 8" DCWF Fire Water "C" Riser Isolated 7' Deep 11/3/04

OLD GAS W. OF 707 4" NG

B707 8" DCWF Fire Water "D" Riser Isolated 8' Deep 11/1/04

B707 6" SS 6" Sanitary Sewer Plugged at Manhole MH-59 12/1/04

MH-105 MH-98 MH-99 MH-101 MH-210 MH-136 MH-211 MH-202 MH-203 MH-103

566 566A 776 777 729 705 559 5D 5E 561 707 564 569 708 763 750 5C T750B T750C T750G T750D T707F T707G Tent 06 750 Pad Tent 12

EXPLANATION

- Sectors
- Alarm
- 2nd Alarm
- Classified Data
- Classified LAN
- Original Alarm
- Telephone
- Active Telephone
- Alarm (PIDAS)
- Nitrogen Lines
- Natural Gas
- Fuel_Line
- Sewer
- Underground Steam
- DCWF
- Raw Water
- De-Energized Power
- Active DCWF
- Active 13.8 KV
- Active 480 V

Utility Isolations

- Utility Isolations
- Manholes

Original Process Waste Lines

- Left in Place
- Between 3 and 4 Feet
- Removed
- Does Not Exist

New Process Waste Lines

- Removed or Clean-Closed (Remain in Place)
- Remove or In Progress
- Valve Vault Removed or Dispositioned
- Valve Vault Remove or Disposition

UTILTIY NOTES:
1) Hatched line symbols represent removed utilities.
2) Color of manhole indicates utility type.
3) Red Text is a B707 Isolation

Standard Map Features

- Demolished Facility
- Remaining Facility
- Lake and Pond
- Demolished Road
- Paved Road
- Dirt Roads
- Railroad Removed
- Railroad Remaining
- Fence Remaining
- Stream or Ditch
- Rail Spur Easement
- Wetland
- Rip Rap
- FLC Design Boundary

N

30 0 30 60 90 120 Feet

State Plane Coordinate Projection
Colorado Central Zone (3476)
Datum: NAD27

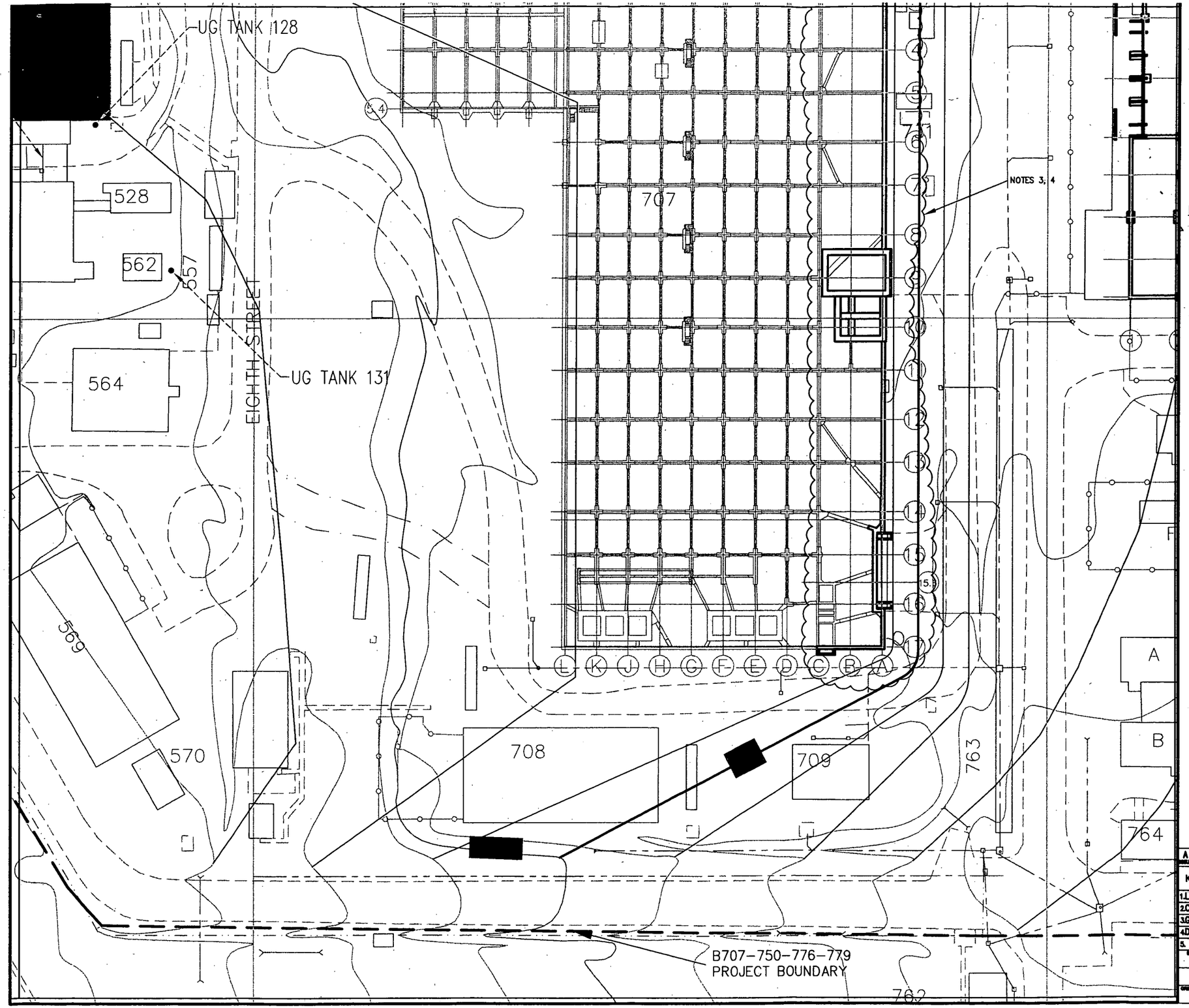
U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared By:
CH2MHILL
GIS DEPT. (303) 966-7707

Prepared For:
KAISER•HILL COMPANY

DATE: 7/13/2005

PATH: \\Gisarv\GIS\Projects\y2005\05-0226\707_Isolations.mxd



ITEM NO.	QUAN.	DESCRIPTION	MATERIAL

B707 FOUNDATION REMOVAL NOTES

1. REMOVE FLOOR SLAB AND ALL COMPONENTS ABOVE FINISHED FLOOR SLAB ELEVATION. FIRST FLOOR ELEVATION IS 5989.0 FEET MSL.
2. PLACE AND COMPACT SOIL TO FILL PITS, BASEMENTS, UNDERPASSES, VAULTS, AND OTHER SUBSURFACE FEATURES. QUANTITY OF FILL REQUIRED IS ESTIMATED TO BE 3,100 CY.
3. AS-BUILT DRAWINGS INDICATE THAT THE MAXIMUM ELEVATION OF SUBSURFACE FOUNDATIONS MEMBERS (TIE BEAMS, PILE CAPS, AND CAISSONS) IS 5987.67 FEET MSL OR 1.33 FEET BELOW FINISHED FLOOR SLAB. SUBSURFACE MEMBERS WEST OF COLUMN C TO REMAIN IN PLACE. FIELD VERIFY AND REMOVAL ANY SUBSURFACE COMPONENTS GREATER THAN ELEVATION 5987.67 FEET MSL FOR COLUMN LINES A, B, AND C, AND FOR COLUMN LINES 0.4, 0.5, AND 1 BETWEEN COLUMNS A AND G. SOIL TO REFILL REMOVED COMPONENTS IS NOT ANTICIPATED.
4. REMOVE ALL COLUMNS, PEDESTALS, GRADE BEAMS, AND WALLS TO TOP OF PILE CAPS FOR COLUMN LINES A, B, AND C, AND FOR COLUMN LINES 0.4, 0.5, AND 1 BETWEEN COLUMNS A AND G.

B750 FOUNDATION REMOVAL NOTES

5. SEE DRAWING C406 FOR FOUNDATION REMOVAL NOTES.

LEGEND:

- 6000 — EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- PAVED ROAD
- UNPAVED ROAD
- FENCE
- EXISTING CULVERT
- 80 — PROPOSED LCDB INDEX GRADE
- PROPOSED LCDB INTERMEDIATE GRADE
- ✕85 PROPOSED LCDB SPOT ELEVATION
- DRAINAGE DITCH/CREEK CENTER LINE
- ENGINEERED CHANNEL BANK
- FOUNDATION COMPONENT TO BE REMOVED (FULLY OR PARTIALLY)
- FOUNDATION COMPONENT TO REMAIN IN PLACE

C401	C402	C403
C404	C405	C406

DRAFT

0 15 30 60
ORIGINAL SCALE: 1"=30'
CONTOUR INTERVAL 2'
ROCKY FLATS COORDINATES

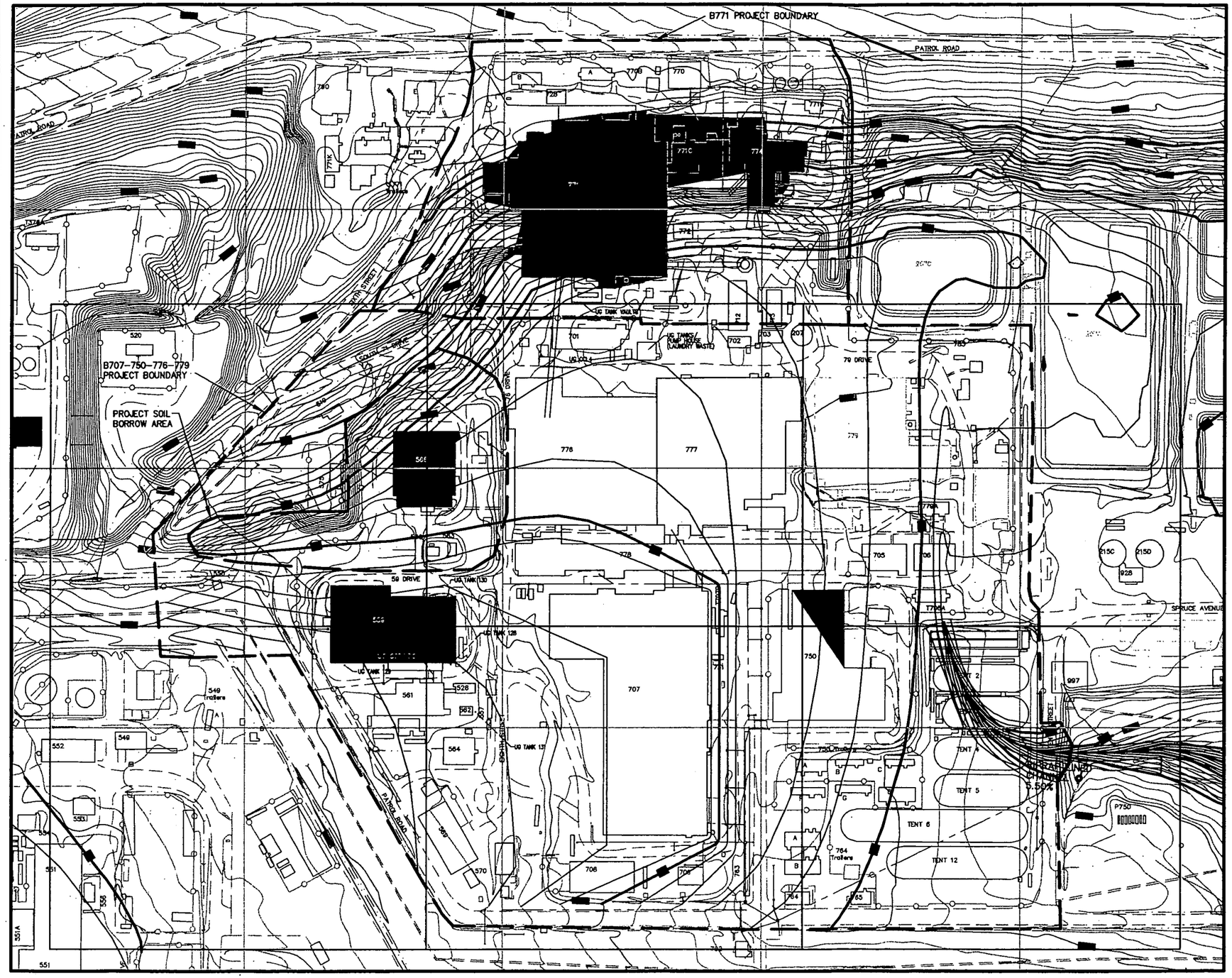
Figure 7

A ISSUE	ISSUED FOR REVIEW DESCRIPTION	KH900286-018 PROJECT/WCF NO.
KEYWORDS: 1.LAND 2.CONFIGURATION 3.GRADING 4.DRAINAGE 5.	TOLERANCES FRACT. ± ANGLE ± DECI. ± UNLESS NOTED OTHERWISE REMOVE BURRS AND SHARP EDGES HEAVY ASSEMBLY	DESIGN COMPANY: PARSONS DESIGNED BY R. STEGEN DRAWN BY R. SOLBERG CHECKED BY J. KAPINOS INDEPENDENT REVIEW APPROVED BY CLASSIFIED ADDITIONAL APPROVALS
BLDG./FACILITY SITE		U.S. DEPARTMENT OF ENERGY ROCKY FLATS OFFICE GOLDEN, COLORADO
ROOM/AREA N/A		Rocky Flats Environmental Technology Site GOLDEN, COLORADO
GRID COORD./COL. NO. N/A	SCALE: AS NOTED	LAND CONFIGURATION DESIGN BASIS IA GRADING AND DRAINAGE PLANS BUILDINGS 707, 750, 776/777, AND 779 GRADING AND FOUNDATION REMOVAL DETAILS #5
		SIZE D — DRAWING NUMBER XXXXX-C405 — ISSUE A

AUTOCAD COMPUTER GENERATED
NO MANUAL CHANGES ALLOWED

Plot date: Feb 09, 2004 - 1:24pm

ITEM NO.	QUAN.	DESCRIPTION	MATERIAL



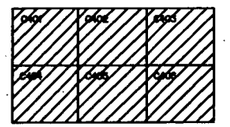
GENERAL NOTES:

1. EXISTING CONTOURS BASED ON 1994 AERIAL TOPOGRAPHICAL SURVEY.
2. COORDINATE GRADING WITH BUILDING 771 PROJECT PER KAISER-HILL DIRECTION.
3. COORDINATE PROTECTION, RE-ROUTING, AND ABANDONMENT OF UTILITIES WITH KAISER-HILL. ELECTRICAL SERVICE DISCONNECTION AND RELOCATION TO BE PREFORMED BY KAISER-HILL.
4. DRAWINGS DO NOT PURPORT TO SHOW ALL EXISTING UTILITIES AND THOSE SHOWN ARE APPROXIMATE BASED UPON AVAILABLE INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND COORDINATING REQUIRED UTILITY LOCATION SERVICES, PERMITTING, AND OPERATIONAL CLEARANCES FROM RFETS UTILITY DEPARTMENT PRIOR TO DIGGING.
5. COORDINATE PROTECTION AND/OR ABANDONMENT OF MONITORING WELLS WITH KAISER-HILL.
6. ESTIMATED EARTHWORK REQUIRED WITHIN B707-750-776-779 PROJECT BOUNDARY.
   DISTURBED AREA: 40 ACRES
   ESTIMATED CUT: 72,000 CY
   ESTIMATED FILL: 92,000 CY
   TOTAL EARTHWORK: 164,000 CY
   SOIL SHORTAGE: 20,000 CY

   SOIL VOLUME ESTIMATES INCLUDE FILLING SUBSURFACE FEATURES AND REPLACEMENT FILL FOR IDENTIFIED REMOVAL OF FOUNDATION COMPONENTS FOR BUILDINGS 707, 750, 776/777, AND 779. FILL THAT MAY BE NEEDED FOR OTHER BUILDINGS WITHIN THE PROJECT AREA OR TO REPLACE UNDER BUILDING CONTAMINATED SOILS IS NOT INCLUDED. SOIL TO FILL TUNNEL BETWEEN BUILDINGS 771 AND 776 IS NOT INCLUDED.
7. OBTAIN GENERAL FILL MATERIAL AS SHOWN ON THIS DRAWING. OBTAINED ADDITIONAL SOIL FROM DESIGNATED ONSITE AREAS AS DIRECTED BY KAISER-HILL.
8. AT THE COMPLETION OF EACH PHASE, DISTURBED AREAS SHALL BE REVEGETATED PER KAISER-HILL STANDARDS.
9. PROVIDE EROSION AND SEDIMENT CONTROLS PER DRAWING C410. SUGGESTED LOCATION OF SILT FENCE SHOWN ON THIS DRAWING.

LEGEND:

- 6000 — EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- PAVED ROAD
- UNPAVED ROAD
- FENCE
- EXISTING CULVERT
- 80 — PROPOSED LCDB INDEX GRADE
- PROPOSED LCDB INTERMEDIATE GRADE
- ✕85 PROPOSED LCDB SPOT ELEVATION
- DRAINAGE DITCH/CREEK CENTER LINE
- ENGINEERED CHANNEL BANK
- SF PROPOSED SILT FENCE



0 50 100 200
ORIGINAL SCALE: 1"=100'
CONTOUR INTERVAL 2'
ROCKY FLATS COORDINATES

DRAFT

Figure 8

ISSUE	ISSUED FOR REVIEW DESCRIPTION	KH900286-018 PROJECT/WCP NO.
KEYWORDS: 1.LAND 2.CONFIGURATION 3.GRADING 4.DRAINAGE 5.	TOLERANCES FRACT. ± ANGLE ± DECI. ± UNLESS NOTED OTHERWISE REMOVE BURRS AND SHARP EDGES NEXT ASSEMBLY N/A SCALE: AS NOTED	DESIGN COMPANY: PARSONS DESIGNED BY R. STEGEN DRAWN BY R. SOLBERG CHECKED BY J. KAPINOS INDEPENDENT REVIEWER APPROVED BY CLASSIFIER ADDITIONAL APPROVALS
BLDG./FACILITY: SITE ROOM/AREA: N/A END ITEM/DWG. NO.: N/A		U.S. DEPARTMENT OF ENERGY ROCKY FLATS OFFICE GOLDEN, COLORADO Rocky Flats Environmental Technology Site GOLDEN, COLORADO LAND CONFIGURATION DESIGN BASIS IA GRADING AND DRAINAGE PLANS BUILDINGS 707, 750, 776/777, AND 779 OVERALL PLAN
		SIZE: D DRAWING NUMBER: XXXXX-C400 ISSUE: A

17/17